HID CORPORATION
Subsidiary of Palomar Technologies Corporation

October 6, 1999

Federal Communications Commission
Ms. Magalie Salas, Secretary
445 12th Street S.W.
Washington, DC 20554

RM-9404 Late Filing of Comments

Dear Ms. Magalie,

HID Corporation apologizes for the late date of the enclosed comments. HID recognizes that the Commission is not obligated to review or consider our comments because they are being made well after the review period.

It is respectively asked that the Commission use our technical concerns and observations merely as reference material.

Sincerely,

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Before the
Federal Communications Commission
Washington, DC 20554

"Amendment of Parts 2 and 97 of the	)	
Commission's Rules to Create a	)	**RM-9404**
Low Frequency Allocation for the	)	
Amateur Radio Service"	)	

Comments of HID Corporation

HID Corporation, with corporate offices in Irvine, California, manufactures, markets, and sells RFID Proximity Readers and Transponders. HID products are extensively used in Access Control and Security Systems. HID Proximity Readers are transceivers with transmitters operating at 125 kHz and receivers operating at 12.5 – 15.625 kHz or 109.375 – 112.5 kHz.

HID apologizes for the late date of these comments. HID only recently learned of the League's Petition for the Rule Making. HID recognizes that neither the Commission nor the League are required to address or consider our comments. It is respectively asked that both review these comments as HID technical concerns relative to the potential of interference to HID products from Amateur Radio transmitters operating in the proposed 135.7 to 137.8 kHz band.

Pertinent Areas for Concern in the Petition for Rule Making

Potential for interference from Amateur Radio stations operating in the proposed 135.7 to 137.8 kHz band.

Comment: This band is close to the 125 kHz carrier and the 109.375 – 112.5 kHz lower side band of HID Proximity RFID Readers.

Comment: HID Readers are full duplex; they transmit and receive simultaneously. This means Amateur signals in the 135.7 – 137.8 kHz band can mix with the 125 kHz carrier of HID Readers and create 10.7 – 12.8 kHz signals that can be detrimental to the operation of the HID Reader receiver. Most HID Reader receivers employ envelope detection of the 125 kHz carrier to recover transponder return signals at 12.5 kHz and 15.625 kHz; receiver bandwidth is wide enough to

receive 10.7 kHz signals. Interfering signals in the receiver passband reduce transponder "read range". If the interfering signal is strong, the transponder cannot be read at all.

Proposed emissions of telegraphy, RTTY, data, SSB telephony, and images, which are the same emissions permitted in the 1800 – 2000 kHz amateur band.

Comment: Except for very low data rates of telegraphy, RTTY, and data the 2.1 kHz bandwidth is easily exceeded. This is especially true for SSB telephony and images where it is impractical to employ such a narrow bandwidth because of long transmission time.

Comment: There is no mention in the Petition of the potential for interference with Part 15 devices.

European Experience with Amateur Operations at 136 kHz

Effective 30 January 1998, the UK Radiocommunications Agency announced a new LF amateur band of 136 kHz. The previously authorized 73 kHz amateur band will be withdrawn from amateur use effective 30 June 2000. The RSGB (Radio Society of Great Britain) reported on 24 January 1999 "The UK 73 kHz frequency allocation came about after lengthy negotiations between the RSGB and the RA. The RSGB was also heavily involved with international discussions, which led to this new European allocation at 136 kHz".

Comment: The previously authorized 73 kHz Amateur band has proved to be an unwise decision. It follows that 136 kHz Amateur operation in one or more European countries may be deemed unwise in the future.

The RSGB also reported on 24 January 1999, "German amateurs are now permitted to use the 136 kHz band [20 W max. transmitter power, 800 Hz max. modulation bandwidth]. Although a specially licensed station DA0LF made some of the first ever transmissions on the band, this license was withdrawn several months ago and Germans have had to be content with listening".

Comment: Germany withdrew the first Amateur license for 136 kHz.

At the RSGB & IOTA 1998 Convention LF Forum, Peter Bobek DA0LF, reported that a spectrum survey in Germany identified many strong commercial stations that had led the DARC to request, for LF frequencies, and the eventual compromise of the current 136 kHz CEPT recommendation for Region 1. Peter also reported that "strong intermodulation interference from the nearby Mainflingen LF radio site makes reception of weak signals difficult, thus 2-way QSOs are unlikely in the lower part of the band [136 kHz]".

Comment: What the compromise is of the current 136 kHz CEPT recommendation for Region 1 can be investigated. Intermodulation between strong commercial stations and 136 kHz Amateur communications has been shown to be a problem.

PA2NJN in the Netherlands used a 900-foot long kite supported vertical long wire antenna for transmitting at 136 kHz. Transmitter output power was 150 watts.

Comment: Amateurs are creative and will go to great lengths (pun intended) to increase antenna efficiency. Increased antenna efficiency equates to more radiated energy and increased likelihood of interference with other radio communications.

136 kHz TRANSMITTERS

A number of European amateurs are freely making their transmitter designs available on the Web. Many of the transmitters, up to and including 1 kilowatt of output power, use high-speed power MOSFETs for the output stage. G3YXM, in the comments on his 1 kW design, says the power MOSFETs operate close to class E and the square wave output is rich in odd harmonics "so an output filter is required before we dare apply this to an aerial".

Comment: Amateurs are more likely to build and use Class D or E MOSFET amplifiers because of cost and efficiency advantages; these have high level odd harmonic output. Typically, depending on MOSFET switching time, harmonics will extend up to about 40 MHz. Without sufficient amplifier output filtering, fractional wavelength antennas that are inefficient at 136 kHz

are efficient and likely resonant at a number of frequencies in the harmonic HF region of 1 – 40 MHz. The FCC does not limit spurious radiation from "home brew" Amateur transmitters or antenna systems.

Texas Instruments Reply of December 23, 1998

The Commission should recognize the public interest inherent in the LF RFID applications supported by TI and several other companies. To this end, TI urges the FCC to refrain from making the 135.7 – 137.8 kHz allocation unless allowing antennas that are designed to emphasize E-field rather than H-field radiation.

Comment: Often Amateurs have restricted space for antennas, particularly at LF. In many of these cases the antenna of choice will be the loop (now a fairly common choice with European Amateurs; several designs are cited on the Web). The loop antenna emphasizes H-field up to one wavelength distance (1.37 miles). It would be precedent setting to restrict Amateurs in Part 97 to the type of antenna used at LF to vertical or long wire antennas or other types of antennas that minimize H-field radiation and maximize E-field radiation.

Comment: Another aspect of the loop antenna that should be considered is its relatively high Q and associated difficulty in tuning it for minimum SWR. When not tuned for minimum SWR, wideband harmonics will be radiated from the feed line and the antenna. The radiated level of harmonics will be exacerbated by a relatively high power transmitter feeding the antenna system and by the fact that most Amateur built transmitters will be Class D or E MOSFET switching designs rich in odd harmonic output. Mismatching between the transmitter output and the feed line and/or between the feed line and the antenna, no matter what type, will cause wideband harmonic radiation.

American Radio Relay League, Inc. January 7, 1999 reply to Texas Instruments Comments

Comment: Suggesting that calculation of EIRP can be addressed in amateur examinations is after the fact for the 360,000 Amateurs already licensed.

It is suggested that the League has not considered the radiation of broadband harmonics from Amateur LF stations when stating, "nor does the League expect that amateur operation will have any interaction at all with RFID or other Part 15 devices operating in the 121 – 134.2 kHz segment.

Comment: The Amateur transmitter carrier and radiated broadband harmonics signals can mix to RFID Reader sidebands or baseband frequencies that can degrade or eliminate the Reader receiver's ability to receive transponder signals. RFID Reader receiver sensitivity is usually on the order of 100 microvolts. RFID Reader receivers are affected by both H-field and E-field interference.

The ARRL suggests that "antenna bandwidth at those frequencies is extremely narrow, and adjacent-frequency interference is unlikely to be a factor".

Comment: Amateur transmitter spurious radiation and any transmitter-feedline-antenna mismatch will negate any advantage of narrow bandwidth.

Comment: It should be noted that high power commercial LF stations have FCC mandated limits for radiated harmonics and therefore have lower potential for interference with Part 15 devices than uncontrolled Amateur radio transmitter spurious emissions radiation.

The ARRL states, "it would seem not unreasonable to suggest that Part 15 RFID manufacturers avoid that very small segment in the design of future products".

Comment: RFID manufacturers most often need backward compatibility with previous products; there are a minimum of hundreds of thousands of RFID Readers already in the marketplace and hundreds of millions of transponders that operate with them.

The ARRL states that as a general matter, the Commission should not make allocation decisions based on the presence of Part 15 devices in a particular band segment. Those devices are, or should be, transparent in the allocation process, as they have no allocation status themselves.

Comment: RFID Access Control and Security Access have established themselves in the marketplace and in the public need for more than ten years. RFID Part 15 transmitters require FCC Equipment Authorization in the form of FCC Certification and have specific FCC limits for carrier and spurious radiation; there is also FCC limits for conducted spurious emissions on the AC Mains input power. Amateur experimental transmitters have no FCC mandated spurious emissions limits, either radiated or conducted. Amateur experimental transmitters are also allowed much higher carrier output power limits. Therefore, Amateur experimental transmitters are more likely to cause interference to other radio communications than Part 15 transmitting devices.

Comment: Even though Part 15 devices "may not cause harmful interference, and must accept any interference received, including interference that may cause undesired operation". It is believed that the Commission should not, in the spirit of minimizing interference with other radio communications, allow transmitter operation in a new Amateur band that may cause interference with FCC Certified Part 15 RFID products that are well established and benefiting the public.

The League acknowledges TI's concerns and will make all "reasonable accommodation" for incumbent Part 15 devices operating in bands adjacent to the 135.7 – 137.8 kHz segment.
Comment: HID Corporation would like to understand how the League can make "reasonable accommodation" for either Part 15 devices or Amateur stations, since both operate under FCC Authorization.

Respectfully submitted,

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Certificate of Service

The undersigned hereby certifies that the preceding document was sent by email and facsimile on October 6, 1999, to the person listed below:

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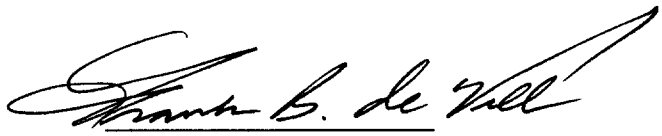

Frank B. de Vall

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